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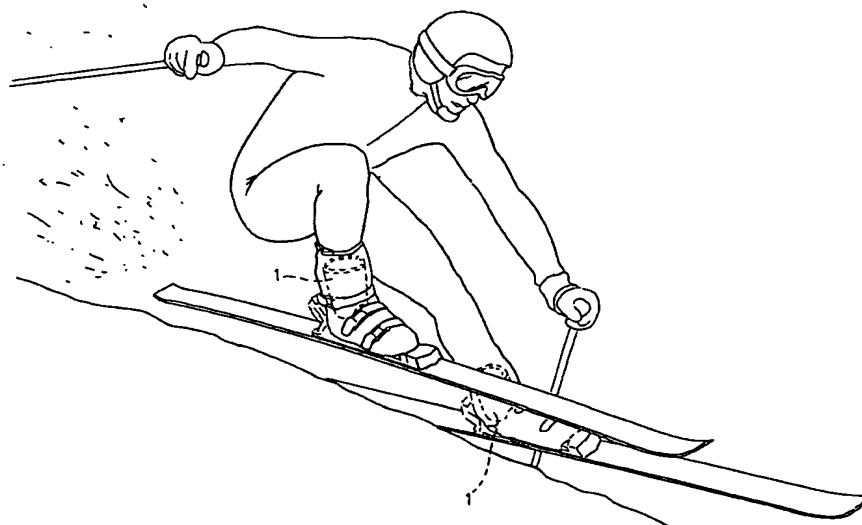
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ning of each regular issue of the PCT Gazette.

(54) Title: DEVICE FOR PROTECTING A LEG



(57) Abstract: The present invention relates to a device (1) for protecting a leg (2), comprising: a body (3) with an underside and an upper side for placing round at least a part of a leg (2) above the foot as seen in vertical direction; wherein the body (3) comprises material with elastic properties, and wherein said body (3) at least partially encloses the leg as seen in horizontal direction.

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## DEVICE FOR PROTECTING A LEG

When relatively sturdy body-protecting or body-covering clothing or footwear are used, there relatively often occurs irritation of bodily tissues such as the skin, or deeper lying bodily tissues such as muscular tissues, or other organs of the human body. Such irritation can for instance occur when hard-shell footwear is used, such as is applied relatively often in the fields of ski or skate shoes and the like. Such types of footwear are therefore usually provided with a relatively soft inner lining.

Such an inner lining is usually unsatisfactory however. During skiing for instance, if the skier holds his lower leg in a forward inclining position, the front side of the leg is loaded heavily, whereby the above stated irritations can occur.

In order to obviate this drawback the present invention provides a device for protecting a leg, comprising:

- a body with an underside and an upper side for placing round at least a part of a leg above the foot as seen in vertical direction,
- wherein the body comprises material with elastic properties, and
- wherein the body at least partially encloses the leg as seen in horizontal direction.

The use of such a device provides an additional protection for the leg. Through the use of such an embodiment the leg is very well protected against irritation resulting from contact between for instance a ski-shoe and the skin. Types of irritation which can for instance be prevented hereby are skin irritations such as grazing or abrasion injuries or

irritations of underlying tissue, such as for instance bruising or contusions.

In a preferred embodiment a substantial part of the body, after being placed round a leg, wholly  
5 encloses the leg in horizontal direction. In this embodiment the body extends wholly around the leg. This has the advantage for instance that the body is firmly attached after placing round the leg. A further  
10 advantage is that the protection of the leg is present on all sides. A good distribution of pressure load coming from outside is hereby possible.

In a further embodiment the underside of the body is provided with a recess for placing on the front side of a leg. If the device is placed round the bottom  
15 part of a leg, it is advantageous if the upper part of the foot is kept free of load by the body. This objective is achieved by the recess of the present embodiment. A further advantage hereof is that, if the leg moves forward relative to a horizontal foot,  
20 material of the body is not caught between the decreasing space between the foot and the leg moving toward it.

The device preferably further comprises at least one support member for supporting a part of the  
25 leg adjacent to the member after placing round a leg. An advantage hereof is that particular parts of a leg can be better supported. This is for instance important since a leg does not have a uniform shape and/or structure. At the front a part of the shinbone can  
30 protrude relative to tissue located round the bone, particularly in the case of load. The skin at the position of the bone can hereby be excessively pinched under load. One or more support members can help prevent such a load.

In a further embodiment two support members on the inner side of the body, which are arranged substantially on either side of the front sides of the body, are useful in preventing the irritation caused by the bone in combination with the hard shell of footwear. Other support members for preventing other irritations can however also be envisaged. It is likewise possible to prevent irritations by cutting out parts of the body, whereby the body exerts no pressure at determined positions. However, the body will then exert pressure at locations round the recess.

The thickness of the body or the support members is preferably variable. A variable thickness of the material of the body has the advantageous effect that the support or pressure on the leg varies with the thickness. Thicker parts of the body provide a greater pressure than thinner parts.

The dimensioning of the body is preferably such that the device fits closely around a leg. It is possible here to envisage a narrower lower part than upper part, since a leg is usually narrower in the ankle region than in the calf region.

The body and/or the support members preferably comprise a plastic. It is possible here to envisage for instance neoprene. This material has very good elastic properties and a very low water-absorbing capacity, whereby little water for instance is absorbed and also that little dirt will be drawn into the material with the water.

A device according to the invention preferably further comprises fastening means for fastening the body round a leg. Certainly if the body does not wholly enclose the leg in horizontal direction, it is advantageous to provide the body with fastening means. Such fastening means enable a good fixation at the

correct position relative to the leg. A specific suitable embodiment of the fastening means is a hook and loop fastening such as velcro tape.

5 In a further embodiment the body is fastened in substantially cylindrical or conical form along a substantially vertical seam. By choosing a correct form and diameter a device is hereby realized with a body which is arranged over the whole surface with a roughly equal degree of tightness.

10 In a further embodiment the body comprises markings for removing a part of the body therealong. As already discussed in the foregoing, it may be advantageous to arrange specific recesses in the body in order to reduce the pressure on the leg at the position  
15 of the recess. Since different users can have different wishes, it is advantageous if the recesses can be arranged as desired by the user. Markings with indications of their function can advantageously assist in creating suitable and/or desired recesses.

20 Further advantages, features and details of the present invention will be described with reference to the annexed figures, in which:

- Figure 1 shows a partly cut-away view of a first embodiment in a first use;
- 25 - Figure 2 is a partly cut-away view of a detail of Figure 1;
- Figure 3 is a perspective view of an embodiment according to the present invention;
- Figure 4 is a partly cut-away view in  
30 perspective of a further embodiment according to the present invention;
- Figure 5 is a view in perspective of a further embodiment according to the present invention;
- Figure 6 is a view in perspective of a  
35 further embodiment according to the present invention;

- Figure 7 is a view in perspective of a further embodiment according to the present invention.

An application of an embodiment according to the present invention (Figure 1) is the placing of a support body round the shinbones of the shown skier. A detail hereof (Figure 2) shows support body 1 that is placed round a leg L. As shown, the form of the support body is chosen such that the diameter at the top is greater than at the bottom so as to thereby follow the contours of the leg.

A further preferred embodiment (Figure 3) is shown in schematic style. In this view the body 3 is shown with a tapering shape. It can however be less conical with a different cutting. The material of this embodiment is preferably neoprene, since this has very useful material properties, such as being very elastic, moisture-proof, soft and yielding. The front side of this embodiment is in the direction of the arrow F. In this embodiment the front side is provided at the bottom with a recess which is bounded by cut surface 5. On the rear side of the device the outer sides of body 3 are attached to each other by means of stitched seam 6. This can optionally be reinforced by means of a glue connection. A glue connection alone can optionally also suffice. Because this embodiment is closed on the rear side, it can be placed in very simple manner round the leg by pulling body 3 over the foot until it is situated round the bottom part of the leg at the correct or desired position.

The thickness of the plastic or neoprene material lies in the range of several millimetres to several centimetres. Such thicknesses can be chosen subject to the load environment in which it will be used. The exact composition of the plastic or neoprene can likewise be chosen subject to the precise

application, so that the most suitable material properties are available.

Figure 4 shows a further embodiment. This comprises a body 7 which is connected at the rear by means of a seam 8 in similar manner to the embodiment in Figure 3. This embodiment is further provided with support means 9, 10 arranged on the inner sides at the front of the body. The positioning is herein such that if the body is situated round a lower leg, the shinbone is located substantially between the support cushions 9, 10. Extra pressure is hereby exerted on the parts adjacent to the shinbone, thereby relieving the pressure on the skin on the shinbone.

In a further embodiment (Figure 5) areas with velcro tape 13 are situated on the inner side of body 12. Extra support cushions 14, 15 are further present which are likewise provided with velcro tape 16. By applying this velcro tape this embodiment can be used both with and without the extra support cushions 14, 15. The support cushions can further be positioned as desired on the inside of body 12, whereby a user of the device can determine for him/herself exactly where they are positioned.

In a further embodiment (Figure 6) the body 17 is not connected fixedly at the rear. In this embodiment velcro tape 18, 19 is provided for fastening the body. It is possible here to place the body more tightly or less tightly round the leg. It is of course possible to leave some space between the left and right-hand sides at the rear of the device.

In a further preferred embodiment the body 21 extends over a part of the periphery of a leg. The body is here provided with fastening means in the form of for instance velcro tape 22 for fastening the body round a leg. It is likewise possible to embody such an

embodiment without fastening means 22, wherein the body 21 is clamped against a leg by means of for instance a stocking or hard-shell footwear inside which the body is applied.

5 Further advantages of the above described embodiments are that, for instance in the application in a ski-shoe, the leg can be placed firmly in the leg part of the ski-shoe during skiing, thereby enabling better steering of the ski during use. If the underside of the  
10 leg part is placed just above the ankle, the presence here of the resilient elastic material relieves the pressure on the protruding ankles. An additional protection for the leg by means of a device according to the present invention is becoming increasingly more  
15 important because higher speeds are becoming possible through developments relating to skis. The skier is hereby loaded more at the position of the lower leg, whereby extra support becomes more important.

It is further possible to adapt the design of  
20 the bodies specifically to a left leg and a right leg, whereby account can be taken of specific differences in the shape of a left leg and a right leg.

Because the material can stretch, practically all leg sizes can be provided with a suitable leg part  
25 using a limited number of sizes. A further advantage of the material choice is that it has a particularly low specific weight, thereby simplifying transport of the leg parts. When designing the support bodies it is further possible to take into account the differences  
30 between the legs of women and men. Aspects of design and dimensioning are both important here.

Further types of material which can be applied in the above described embodiments are diverse types of rubber or latex, such as medicinal rubber, orthopaedic  
35 rubber. Foam types such as memory foam, such as Tempur,



can also be very readily applied. Embodiments comprising closed cell foam are also very practical.

The rights are not limited by the above described embodiments. The rights sought are defined by  
5 the following claims.

## CLAIMS

1. Device for protecting a leg, comprising:
  - a body with an underside and an upper side for placing round at least a part of a leg above the foot as seen in vertical direction,
  - 5       - wherein the body comprises material with elastic properties, and
  - wherein the body at least partially encloses the leg as seen in horizontal direction.
2. Device as claimed in claim 1, wherein a  
10       substantial part of the body, after being placed round a leg, wholly encloses the leg in horizontal direction.
3. Device as claimed in claim 1 or 2, wherein the underside of the body is provided with a recess for placing on the front side of a leg.
- 15       4. Device as claimed in one or more of the foregoing claims, comprising at least one support member for supporting a part of the leg adjacent to the member after placing round a leg.
- 20       5. Device as claimed in claim 4, comprising two support members on the inner side of the body, which are arranged substantially on either side of the front side of the body.
- 25       6. Device as claimed in claim 4 or 5, wherein the support members comprise the same materials as the body.
7. Device as claimed in one or more of the foregoing claims, wherein the thickness of the body or the support members is variable.
- 30       8. Device as claimed in one or more of the foregoing claims, wherein the dimensioning is chosen such that the device fits closely around a leg.

9. Device as claimed in one or more of the foregoing claims, wherein the body and/or the support members comprise a plastic.

10. Device as claimed in one or more of the foregoing claims, wherein the body and/or the support members comprise neoprene.

11. Device as claimed in one or more of the claims 1-9, wherein the body and/or the support members comprise foam or memory foam.

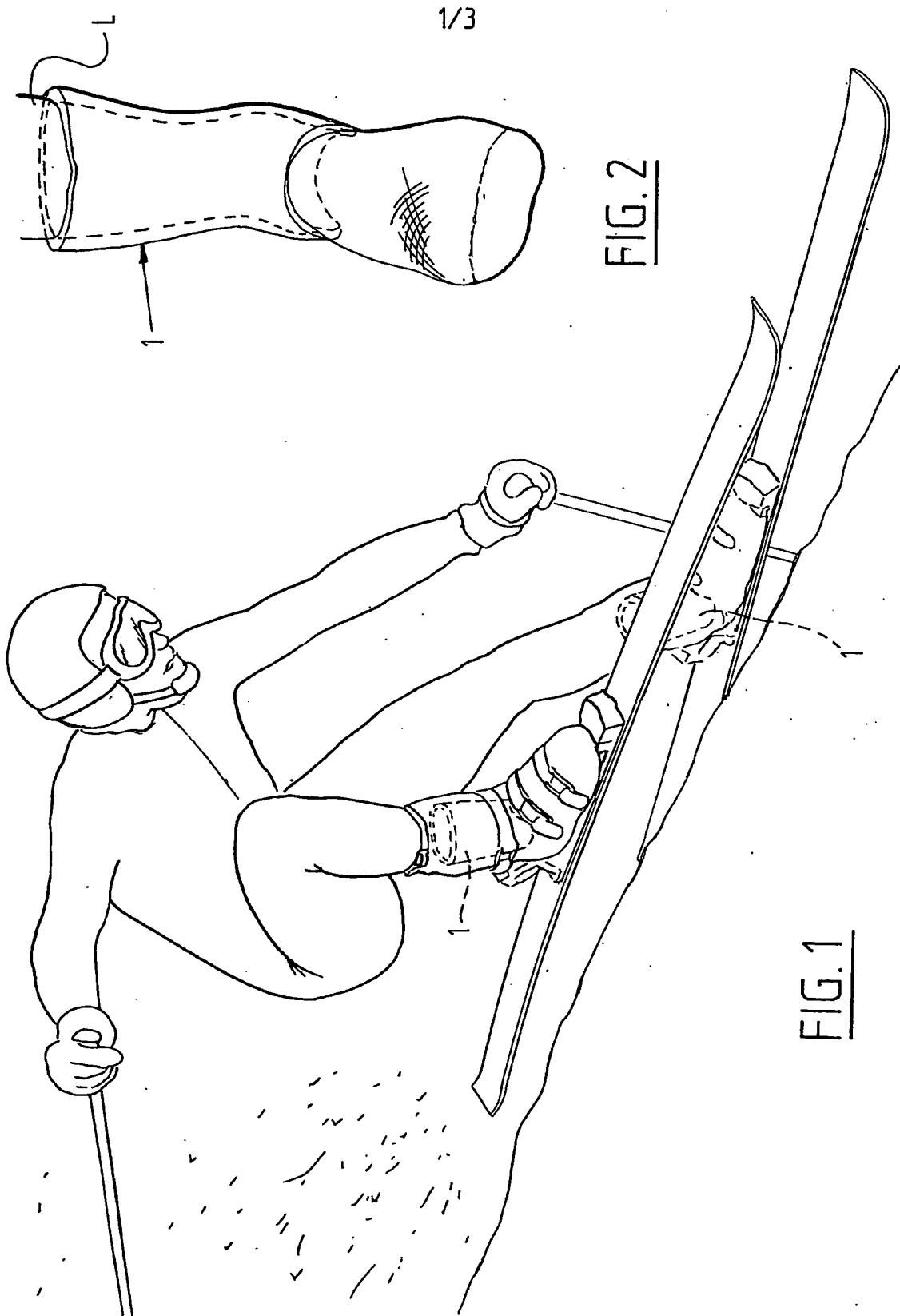
12. Device as claimed in one or more of the claims 1-8, wherein the body and/or the support members comprise rubber or latex.

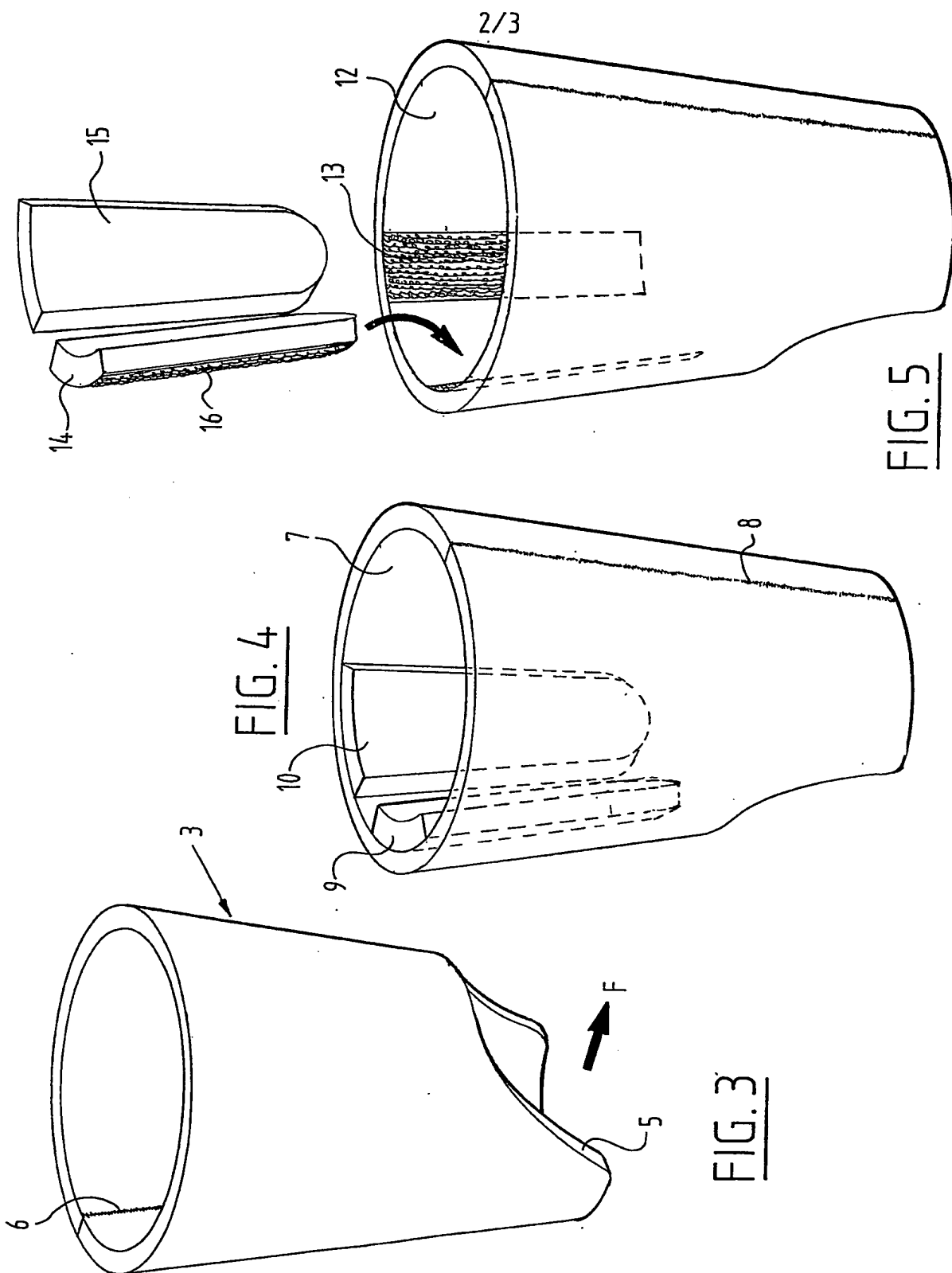
13. Device as claimed in one or more of the foregoing claims, further comprising fastening means for fastening the body round a leg.

14. Device as claimed in claim 13, wherein the fastening means comprises a hook and loop fastening such as velcro tape.

15. Device as claimed in one or more of the claims 1-12, wherein the body is fastened in substantially cylindrical or conical form along a substantially vertical seam.

16. Device as claimed in one or more of the foregoing claims, comprising markings for removing at least a part of the body therealong.





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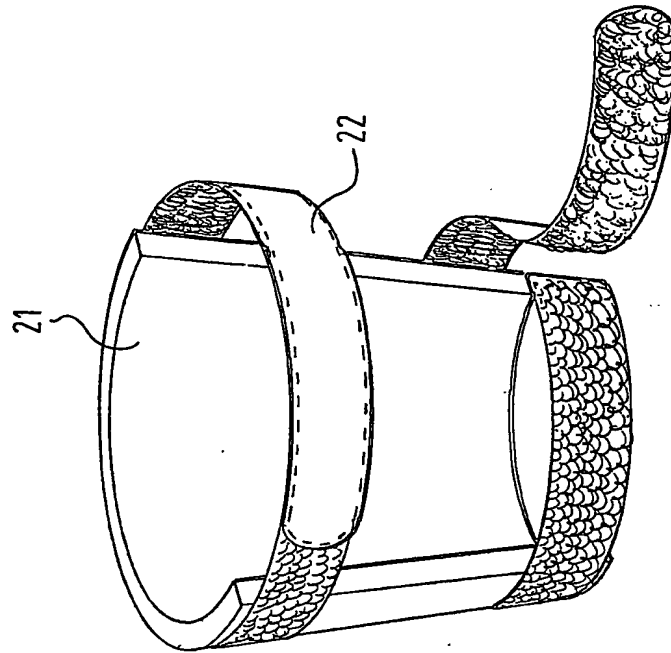


FIG. 7

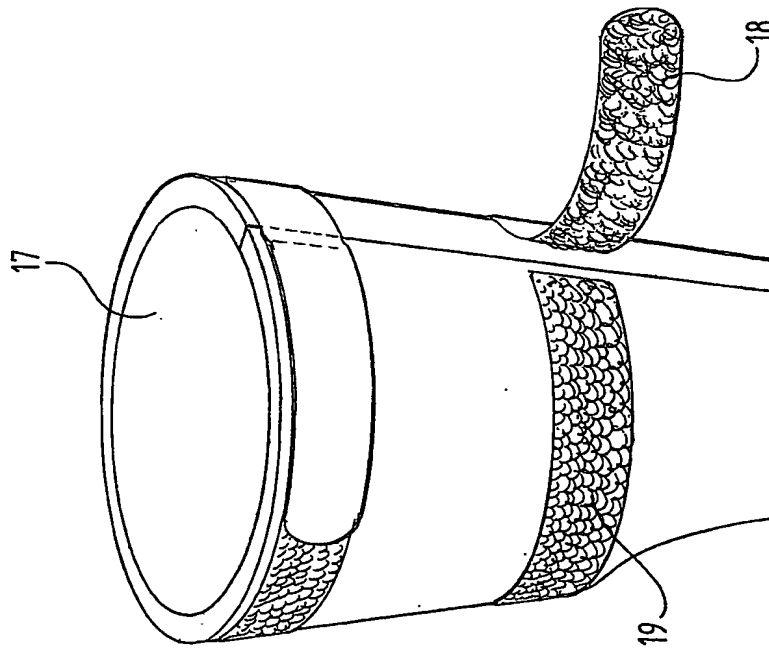


FIG. 6

# INTERNATIONAL SEARCH REPORT

International Application No

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**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 A63B71/12

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 A63B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

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X	DE 199 51 990 C (ALFIERI ANTONIO) 25 January 2001 (2001-01-25) column 2, line 32 -column 3, line 62; figures 2A,5	1-15
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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# INTERNATIONAL SEARCH REPORT

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
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Information on patent family members

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